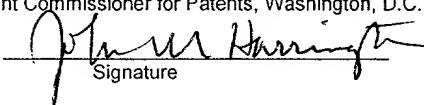


| | | | |
|---|---|--|---|
| FORM PTO-1390 (REV 1-98) | | U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE | ATTORNEY'S DOCKET NUMBER |
| TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371 | | 04851/257561 | |
| INTERNATIONAL APPLICATION NO. PCT/DE99/03616 | | INTERNATIONAL FILING DATE 11/12/99 | U S APPLICATION NO (If known, see 37 CFR 1.5) 09/830831 |
| TITLE OF INVENTION Procedure and Equipment to Improve the Audio Quality in a Mobile Radio Network | | PRIORITY DATE CLAIMED 11/12/98 | |
| APPLICANT(S) FOR DO/EO/US Bernhard BUDNIK | | | |
| Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information: | | | |
| 1. | <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. | | |
| 2. | <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. | | |
| 3. | <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 37 (b) and PCT Articles 22 and 39(1). | | |
| 4. | <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. | | |
| 5. | <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) | | |
| | a. <input type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau) | | |
| | b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau | | |
| | c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). | | |
| 6. | <input checked="" type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). | | |
| 7. | <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) | | |
| | a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). | | |
| | b. <input checked="" type="checkbox"/> have been transmitted by the International Bureau. | | |
| | c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired | | |
| | d. <input type="checkbox"/> have not been made and will not be made. | | |
| 8. | <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). | | |
| 9. | <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)) | | |
| 10. | <input type="checkbox"/> A translation of the annexes of the International Preliminary Examination Report under PCT Article 36 | | |
| 11. | <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.197 and 1.98 | | |
| 12. | <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. | | |
| 13. | <input type="checkbox"/> A FIRST preliminary amendment. | | |
| | <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. | | |
| 14. | <input type="checkbox"/> A substitute specification. | | |
| 15. | <input type="checkbox"/> A change of power of attorney and/or address letter. | | |
| 16. | <input type="checkbox"/> Other items or information: | | |
| <p>1. I hereby certify that this Transmittal Letter to the United States Designated/Elected Office (DO/EO/US) Concerning a Filing under 35 U.S.C. 371, along with any paper referred to as being attached or enclosed, is being deposited with the United States Postal Service on this <u>1</u> day of <u>MAY</u> 2001 in an envelope as "Express Mail Post Office to Addressee" service under 37 CFR 1.10, Mailing Label Number EL694910415US addressed to the Box PCT, Assistant Commissioner for Patents, Washington, D.C. 20231.</p> <p> Signature</p> | | | |

JC08 Rec'd PCT/PTO 01 MAY 2001
 EXPRESS MAIL NO. ELL694910415us
 JC08 Rec'd PCT/PTO 01 MAY 2001

| | | | |
|--|-------------------------------|---------------------------|-------------------|
| U.S. APPLICATION NO. (if known, see 37 CFR 1.492) | INTERNATIONAL APPLICATION NO. | ATTORNEY'S DOCKET NUMBER | |
| 17. <input checked="" type="checkbox"/> The following fees are submitted BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): | | CALCULATIONS PTO USE ONLY | |
| Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO and International Search Report not prepared by the EPO or JPO | | \$1,000.00 | |
| International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO | | \$860.00 | |
| International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2) paid to USPTO | | \$710.00 | |
| International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) | | \$690.00 | |
| International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) | | \$100.00 | |
| ENTER APPROPRIATE BASIC FEE AMOUNT = | | \$860.00 | |
| Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)). | | \$ 0.00 | |
| CLAIMS | NUMBER FILED | NUMBER EXTRA | RATE |
| Total claims | 15 - 20 = | 0 | X \$18.00 \$ 0.00 |
| Independent claims | 1 - 3 = | 0 | X \$80.00 \$ 0.00 |
| MULTIPLE DEPENDENT CLAIM(S) (if applicable) | | + \$270.00 | \$ 0.00 |
| TOTAL OF ABOVE CALCULATIONS = | | \$ 0.00 | |
| Reduction of 1/2 for filing by small entity, if applicable A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) | | \$ 0.00 | |
| SUBTOTAL = | | \$ 860.00 | |
| Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)). | | \$ 0.00 | |
| TOTAL NATIONAL FEE = | | \$ 860.00 | |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40 per property | | \$ 0.00 | |
| TOTAL FEES ENCLOSED = | | \$ 860.00 | |
| | | Amount to be refunded: \$ | |
| | | charged: \$ | |
| <p>a. <input checked="" type="checkbox"/> A check in the amount of <u>\$ 860.00</u> to cover the above fees is enclosed.</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. 16-1435 in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 16-1435. A duplicate copy of this sheet is enclosed.</p> | | | |
| <p>NOTE. Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b) must be filed and granted to restore the application to pending status.</p> | | | |
| <p>SEND ALL CORRESPONDENCE TO:</p> <p> SIGNATURE</p> <p>KILPATRICK STOCKTON LLP 1001 West Fourth Street Winston-Salem, NC 27101</p> | | | |
| <p>04851-257561 WINLIB01:885094.1</p> | | | |

09/830831

Express Mail No. EL694910415US

JC08 Recd PCT/PTO 0 1 MAY 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Bernhard Budnik
Application No.: To be assigned (US Nat'l Phase of PCT/DE99/03616)
Filed: Herewith
For: PROCEDURE AND EQUIPMENT TO IMPROVE
THE AUDIO QUALITY IN A MOBILE RADIO
NETWORK
Examiner: To Be Assigned
Group Art Unit: To Be Assigned

Assistant Commissioner for Patents
Washington, DC 20231

Preliminary Amendment

Sir:

Please amend the above-identified application as follows:

In the Claims:

Please amend the claims as follows:

In claim 3, line 1, please change "Claims 1 or 2" to --claim 2--.

In claim 4, line 1, please change "one of the Claims 1 - 3" to --claim 3--.

In claim 5, line 1, please change "one of the Claims 1 - 4" to --claim 4--.

In claim 6, line 1, please change "one of the Claims 1 - 5" to --claim 5--.

In claim 7, line 1, please change "one of the Claims 1 - 6" to --claim 6--.

In claim 8, line 1, please change "one of the Claims 1 - 6" to --claim 6--.

In claim 9, line 1, please change "one of the Claims 1 - 8" to --claim 8--.

In claim 10, line 1, please change "the Claims 1 - 9" to --claim 9--.

In claim 13, line 1, please change "one of the Claims 10 – 12" to --claim 10--.

In claim 14, line 1, please change "one of the Claims 10 – 12" to --claim 10--.

In claim 15, line 1, please change "one of the Claims 10 – 14" to --claim 10--.

REMARKS

The foregoing Amendment eliminates multiple dependent claims.

Accordingly, the Amendment places the application in better condition prior to examination and adds no new matter.

Version With Markings to Show Changes Made**Amendments in the Claims:**

In accordance with 37 CFR 1.121(c), the following versions of the claims as rewritten by the foregoing amendment show all the changes made relative to the previous versions of the claims.

3. (amended) Procedure, according to [Claims 1 or 2] claim 2, is characterized by the base station control (3), as well as the mobile switching center (5), that determines the end device type (s) (1) by query of the mobile equipment identification and assigns to the appropriate end device type corresponding pre-determined parameters, which serve to adjust the tone control.

4. (amended) Procedure according to [one of the Claims 1 – 3] claim 3, is characterized by the parameters that are stored for all marketable mobile radio device and equipment (1) in a data storage (6) (memory) and can be recalled when needed.

5. (amended) Procedure, according to [one of the Claims 1 – 4] claim 4, is characterized by the fact that stored parameters of the tone control (7) of the corresponding audio path are configured based on the type of end device (1).

6. (amended) Procedure, according to [one of the Claims 1 – 5] claim 5, is characterized by the parameters that are transferred by one of the mobile switching centers (5) or another network component supplied control signal (8) to the tone control (7).

7. (amended) Procedure, according to [one of the Claims 1 – 6] claim 6, is characterized by the tone control (7) that is switched into the audio path (10) in the area of the mobile switching center (5) or the base station control (3).

8. (amended) Procedure, according to [one of the Claims 1 – 6] claim 6, is characterized by the tone control (7) that is switched into the audio path (10) in the area of the code conversion equipment (Transcoder/Rate Adaption Unit) (4).

9. (amended) Procedure, according to [one of the Claims 1 – 8] claim 8, is characterized by the tone control that is adjusted dependent upon the users' individual features.

10. (amended) Equipment to complete the procedure, according to [the Claims 1 – 9] claim 9, is characterized by a tone control (7) that is switched into by one of the corresponding audio paths in a communication connection.

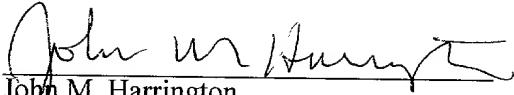
13. (amended) Equipment, according to [one of the Claims 10 – 12] claim 10, is characterized by the tone control (7) that is part of the code conversion equipment (Transcoder/Rate Adaption Unit) (4).

14. (amended) Equipment , according to [one of the Claims 10 – 12] claim 10, is characterized by the tone control (7) that is connected or switched before or after the code conversion device (Transcoder/Rate Adaption Unit) (4).

15. (amended) Equipment, according to [one of the Claims 10 – 14] claim 10, is characterized by the tone control (7) that includes a multiplicity of tone control units, which correspond in each case to an audio path (10).

Respectfully submitted,

Date: 5/1/01



John M. Harrington
Attorney for Applicant
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1001 West Fourth Street
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(336) 607-7318

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Bernhard Budnik
Application No.: To be assigned (US Nat'l Phase of PCT/DE99/03616)
Filed: May 1, 2001
For: PROCEDURE AND EQUIPMENT TO IMPROVE
THE AUDIO QUALITY IN A MOBILE RADIO
NETWORK

Examiner: To Be Assigned
Group Art Unit: To Be Assigned

Assistant Commissioner for Patents
BOX: PCT
Washington, DC 20231

Second and Subsequent Preliminary Amendment

Sir:

Please amend the above-identified application, prior to examination, pursuant to the English translation of PCT International Preliminary Examination Annexes, copy provided, as follows:

In the Specification:

On page 1, please delete the first paragraph and replace it with the following paragraph:

The invention concerns a procedure and equipment for improving audio quality in a mobile radio network.

On page 2, before the first paragraph, please add the following paragraph:

A procedure for the user's individual improvement of sound quality with telephones is made known in EP-A-0 705 016. Before or during a discussion connection, the quality of sound can be improved in the current discussion connection, according to specifications or settings of the user by appropriate equipment in the communication network. For this, the user inputs the desired specifications or settings manually by his/her telephone, or his/her identity is determined automatically by the communications network so that based on the determined identity, whose specifications have been previously set, are recalled from a data base. The improvement of the sound quality, which is dependent on the end equipment or device, is not provided.

On page 2, after the first paragraph, please add the following paragraphs:

The task is solved by the characterizing features in Patent Claim 1.

The invention is based on the fact that a tone control is switched into a corresponding communication connection's audio path, which influences the audio quality in the audio path, dependent on the type of equipment or devices used in the connection, in that the sound is changed in the audio path.

On page 2, please delete the fifth paragraph and replace it with the following paragraph:

Together with the end device, a tone control is configured into one of the audio paths so that it, for example, increases the level with a particularly muffled sounding device. In a further development of the invention, it is provided that the influence of the audio quality is different in the connection direction from the calling user to the called user and from the called user to the calling user.

In the Claims:

Please rewrite claim 1 as follows:

1. (amended) Procedure to improve the audio quality in a mobile radio network, with which a tone control (7) that is switched into one of the communication connection's corresponding audio paths (10), that, dependent upon the types of end device(s) or equipment being used in the connection, influences the audio quality in the audio path (10), in that the sound in the audio path is changed.

Please rewrite claims 3 through 10 as follows:

3. (twice amended) Procedure, according to claim 2, is characterized by the base station control (3), as well as the mobile switching center (5), that determines the end device type (s) (1) by query of the mobile equipment identification and assigns to the appropriate end device type corresponding pre-determined parameters, which serve to adjust the tone control.
4. (twice amended) Procedure according to claim 3, is characterized by the parameters that are stored for all marketable mobile radio device and equipment (1) in a data storage (6) (memory) and can be recalled when needed.
5. (twice amended) Procedure, according to claim 4, is characterized by the fact that stored parameters of the tone control (7) of the corresponding audio path are configured based on the type of end device (1).
6. (twice amended) Procedure, according to claim 5, is characterized by the parameters that are transferred by one of the mobile switching centers (5) or another network component supplied control signal (8) to the tone control (7).

7. (twice amended) Procedure, according to claim 6, is characterized by the tone control (7) that is switched into the audio path (10) in the area of the mobile switching center (5) or the base station control (3).

8. (twice amended) Procedure, according to claim 6, is characterized by the tone control (7) that is switched into the audio path (10) in the area of the code conversion equipment (Transcoder/Rate Adaption Unit) (4).

9. (twice amended) Procedure, according to claim 8, is characterized by the tone control that is adjusted dependent upon the users' individual features.

10. (twice amended) Devices or equipment to complete the procedure, according to claim 9, encompassing a tone control (7) that is switched into a communication connection's audio path.

Please rewrite claims 13 through 15 as follows:

13. (twice amended) Equipment, according to claim 10, is characterized by the tone control (7) that is part of the code conversion equipment (Transcoder/Rate Adaption Unit) (4).

14. (twice amended) Equipment , according to claim 10, is characterized by the tone control (7) that is connected or switched before or after the code conversion device (Transcoder/Rate Adaption Unit) (4).

15. (twice amended) Equipment, according to claim 10, is characterized by the tone control (7) that includes a multiplicity of tone control units, which correspond in each case to an audio path (10).

Version With Markings to Show Changes Made

Amendments in the Specification:

In accordance with 37 CFR 1.121(c), the following replacement paragraphs show all the changes made by the foregoing amendment relative to the previous version of the paragraphs.

Page 1, 1st Paragraph:

The invention concerns a procedure and equipment for improving audio quality in a mobile radio network [according to the characterizing clause of the patent claims 1].

Page 2, 5th Paragraph:

Together with the end device, a tone control is configured into one of the audio paths so that it, for example, increases the level with a particularly muffled sounding device. In a further development of the invention, it is provided that the influence of the audio quality is different in the connection direction from the calling user to the called user and from the called user to the calling user.

Amendments in the Claims:

In accordance with 37 CFR 1.121(c), the following versions of the claims as rewritten by the foregoing amendment show all the changes made relative to the previous versions of the claims.

1. (amended) Procedure to improve the audio quality in a mobile radio network, [is characterized by the tone control (7) that is switched into one of the communication connections corresponding audio paths (10), that, in dependence on the connection of the end device being used, influences the audio quality in the audio path (10)] with which a tone control (7) that is switched into one of the communication connection's corresponding audio paths (10), that, dependent upon the types of end device(s) or equipment being used in the connection, influences the audio quality in the audio path (10), in that the sound in the audio path is changed.

3. (twice amended) Procedure, according to [Claims 1 or 2] claim 2, is characterized by the base station control (3), as well as the mobile switching center (5), that determines the end device type (s) (1) by query of the mobile equipment identification and assigns to the appropriate end device type corresponding pre-determined parameters, which serve to adjust the tone control.

4. (twice amended) Procedure according to [one of the Claims 1 – 3] claim 3, is characterized by the parameters that are stored for all marketable mobile radio device and equipment (1) in a data storage (6) (memory) and can be recalled when needed.

5. (twice amended) Procedure, according to [one of the Claims 1 – 4] claim 4, is characterized by the fact that stored parameters of the tone control (7) of the corresponding audio path are configured based on the type of end device (1).

6. (twice amended) Procedure, according to [one of the Claims 1 – 5] claim 5, is characterized by the parameters that are transferred by one of the mobile switching centers (5) or another network component supplied control signal (8) to the tone control (7).

7. (twice amended) Procedure, according to [one of the Claims 1 – 6] claim 6, is characterized by the tone control (7) that is switched into the audio path (10) in the area of the mobile switching center (5) or the base station control (3).

8. (twice amended) Procedure, according to [one of the Claims 1 – 6] claim 6, is characterized by the tone control (7) that is switched into the audio path (10) in the area of the code conversion equipment (Transcoder/Rate Adaption Unit) (4).

9. (twice amended) Procedure, according to [one of the Claims 1 – 8] claim 8, is characterized by the tone control that is adjusted dependent upon the users' individual features.

10. (twice amended) [Equipment to complete the procedure, according to claim 9, is characterized by a tone control (7) that is switched into by one of the corresponding audio paths in a communication connection] Devices or equipment to complete the procedure, according to claim 9, encompassing a tone control (7) that is switched into a communication connection's audio path.

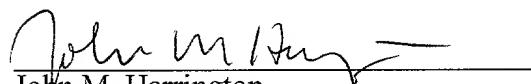
13. (twice amended) Equipment, according to [one of the Claims 10 – 12] claim 10, is characterized by the tone control (7) that is part of the code conversion equipment (Transcoder/Rate Adaption Unit) (4).

14. (twice amended) Equipment , according to [one of the Claims 10 – 12] claim 10, is characterized by the tone control (7) that is connected or switched before or after the code conversion device (Transcoder/Rate Adaption Unit) (4).

15. (twice amended) Equipment, according to [one of the Claims 10 – 14] claim 10, is characterized by the tone control (7) that includes a multiplicity of tone control units, which correspond in each case to an audio path (10).

Respectfully submitted,

Date: 5/11/01



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04851-257561
WINLIB01:887290.1

Procedure and Equipment to Improve the Audio Quality in a Mobile Radio Network

Description

The invention concerns a procedure and equipment for improving audio quality in a mobile radio network.

The mobile radio network, e.g. the GSM-mobile radio network, is -- apart from a given range limitation and the used speech decoder -- sound (acoustic pattern) neutral.

The sound perceived by the mobile radio user is determined primarily by the mobile radio equipment being used; whereby, each manufacturer of the equipment "stamps" a different sound into his equipment. The currently available end device models have, to a great extent, large sound differences, which are perceived by the device users to be pleasant or less-than-pleasant.

It was determined by public opinion polls and surveys, for example, that the GSM1800 networks have a better sound than the GSM900 networks. Since this cannot be comprehended technically, it seems a likely supposition that this is because of the equipment's characteristics; that is, the better sound results not from the GSM1800 networks, but from the end devices used in this network.

A procedure for the user's individual improvement of sound quality with telephones is made known in EP-A-0 705 016. Before or during a discussion connection, the quality of sound can be improved in the current discussion connection, according to specifications or settings of the user by appropriate equipment in the communications network. For this, the user inputs the desired specifications or settings manually by his / her telephone, or his / her identity is determined automatically by the communications network so that based on the determined identity, whose specifications have been previously set, are recalled from a data base. The improvement of the sound quality, which is dependent on the end equipment or device, is not provided.

The invention is based on the fact that a tone control or equalizer is switched into a corresponding audio path in a communication connection, which influences the audio quality in the audio path, dependent on the type of equipment or devices used in the connection.

The task is solved by the characterizing features in Patent Claim 1.

The invention is based on the fact that a tone control is switched into a corresponding communication connection's audio path, which influences the audio quality in the audio path, dependent on the type of equipment or devices used in the connection, in that the sound is changed in the audio path.

Thus, the advantage is achieved that if there are eventual deficiencies of the audio quality of individual end device models, adjustments can be made on the network side, i.e. unnoticed by the user.

Now the network carrier, not the end device manufacturer, determines the sound characteristics of its network by determining the characteristics of the end devices' sound for each end device model.

This results in a direct quality leap for a network equipped with the invention. An end device with an inferior sound in a convention network gets a good sound quality in a network that uses the invention. The device user is then connected directly to the network quality, as shown above in the given opinion surveys.

Together with the end device, a tone control is configured into one of the audio paths so that it, for example, increases the level with a particularly muffled sounding device. In a further development of the invention, it is provided that the influence of the audio quality is different in the connection direction from the calling user to the called user and from the called user to the calling user.

The mobile switching center (MSC) determines by query of the mobile equipment identification (IMEI: International Mobile Equipment Identity) the device model. The query of the IMEI is usually always already completed with the authentication procedure between the mobile station and the mobile radio network, so that the mobile radio network accepts only devices or equipment with certified IMEI.

For each type of device, the corresponding sound parameters are stored and are at any time accessible in the data bank of the mobile switching center. The tone control of the

5 corresponding audio path is configured on the basis of the sound parameters stored in a certain type of equipment or device. The sound parameter can also be pre-held advantageously in the tone control itself.

The control signal for controlling the tone control is preferably supplied or prepared by
10 the mobile switching center, but can also be prepared or supplied by any other authority of the mobile radio network. It is also conceivable to follow the signaling by means of a separate trace-device on the different interfaces of the mobile radio systems and to steer the tone control with the data derived from it.

15 In a preferred embodiment of the invention, the tone control is located close to the Transcoder/Rate Adaption Unit (TRAU) and can preferably be equipped as a part of the code conversion. The code conversion TRAU converts from the base station control BSC PCM-A-Law in a 64 Kbytes(Kbits)/s-signal, which is further processed in the mobile switching center (MSC).

20 In accordance with another embodiment, the tone control, as a separate unit of the code conversion, is pre-switched or subsequently switched. The tone control can also be placed in the mobile switching center. It is just important that the tone control is switched, seen from the installation expense perspective, at a favorable position in the
25 audio path. A preferred position is, for example, there where there are a multiplicity of audio channels; also, for example in the TRAU or the MSC. The tone control includes, preferably, not only one tone control unit, but also a multiplicity of tone control units, which can be assigned to one audio path or audio channel.

In a further development of the invention, it is provided that the control signal for the tone control is not only a function of the mobile equipment identification (IMEI), but also
5 as a function of the user's individual features. The tone control could be adjusted differently as, e.g. for the private user, business user, guest user, hearing-impaired user, etc.

Finally, the possibility also exists of using the tone control for speech coding / encoding.

10

In the following, the invention is more closely described on the basis of an embodiment example with reference to the drawing. Further characteristics, features and advantages of the invention are shown in the drawings.

15 Figure 1 shows an example of a GSM-mobile radio network that basically involves equipment at a communication connection between the mobile radio user and the user of a public stationary network.

20 The mobile radio user would like to make a voice connection by means of a mobile radio end device to a user of a public stationary network (9) and enters over a base station (2) in the mobile radio network. The structure of the network is made in a known manner first by the base station (2), the base station control (3) to the mobile switching center (5), which takes over the further connection structure to the public stationary network (9). Between the base station control (3) and the mobile switching center (5), a code
25 conversion (Transcoder/Rate Adaption Unit) is switched on, which can be placed, e.g. within the mobile switching center (5).

Now a tone control (7) is, according to the invention, switched into the audio path (10) of the connection, which is located preferably also in the area of the mobile switching center (5). the tone control (7) is guided by the mobile switching center (5) over a control signal (8). The mobile switching center (5) determines the device model (1) used by the mobile radio user during the construction of the connection by query of the mobile equipment identification (IMEI). The query of the IMEI corresponds to the standards intended by GSM. Each marketable type of device and equipment has corresponding sound parameters stored in a data bank (6) of the mobile switching center (5) and are accessible at any time. On the basis of the sound parameters stored to a certain type of device or equipment, the tone control (7) by the control signal (8) is configured by the connection of the corresponding audio paths. The sound parameters can also be advantageously pre-held in the tone control (7) itself. The tone control (7) now influences, corresponding to the specification, the sound in the audio path (10) and improves, corrects and / or evens out the sound.

2000 1000 800 600 400 200 100 50 25 10 5 2 1

Patent Claims

1. Procedure to improve the audio quality in a mobile radio network, with which a tone control (7) that is switched into one of the communication connection's corresponding audio paths (10), that, dependent upon the types of end device (s) or equipment being used in the connection, influences the audio quality in the audio path (10), in that the sound in the audio path is changed.
2. Procedure, according to Claim 1, is characterized by the influence of audio quality that is different in the connection direction from the caller to the called user and from the called user to the calling user.
3. Procedure, according to Claims 1 or 2, is characterized by the base station control (3), as well as the mobile switching center (5), that determines the end device type (s) (1) by query of the mobile equipment identification and assigns to the appropriate end device type corresponding pre-determined parameters, which serve to adjust the tone control.
4. Procedure, according to one of the Claims 1 - 3, is characterized by the parameters that are stored for all marketable mobile radio device and equipment (1) in a data storage (6) (memory) and can be recalled when needed.
5. Procedure, according to one of the Claims 1 - 4, is characterized by the fact that stored parameters of the tone control (7) of the corresponding audio path are configured based on the type of end device (1).
6. Procedure, according to one of the Claims 1 - 5, is characterized by the parameters that are transferred by one of the mobile switching centers (5) or another network component supplied control signal (8) to the tone control (7).

7. Procedure, according to one of the Claims 1 - 6, is characterized by the tone control (7) that is switched into the audio path (10) in the area of the mobile switching center (5) or the base station control (3).
8. Procedure, according to one of the Claims 1 - 6, is characterized by the tone control (7) that is switched into the audio path (10) in the area of the code conversion equipment (Transcoder/Rate Adaption Unit) (4).
9. Procedure, according to one of the Claims 1 - 8, is characterized by the tone control that is adjusted dependent upon the users' individual features.
10. Devices or equipment to complete the procedure, according to the Claims 1 - 9, encompassing a tone control (7) that is switched into a communication connection's audio path.
11. Equipment, according to Claim 10, is characterized by the tone control (7) that is located in the base station control (3).
12. Equipment, according to Claim 10, is characterized by the tone control (7) that is located in the mobile switching center (5).
13. Equipment, according to one of the Claims 10 - 12, is characterized by the tone control (7) that is part of the code conversion equipment (Transcoder/Rate Adaption Unit) (4).
14. Equipment , according to one of the Claims 10 - 12, is characterized by the tone control (7) that is connected or switched before or after the code conversion device (Transcoder/Rate Adaption Unit) (4).

15. Equipment, according to one of the Claims 10 - 14, is characterized by the tone control (7) that includes a multiplicity of tone control units, which correspond in each case to an audio path (10).

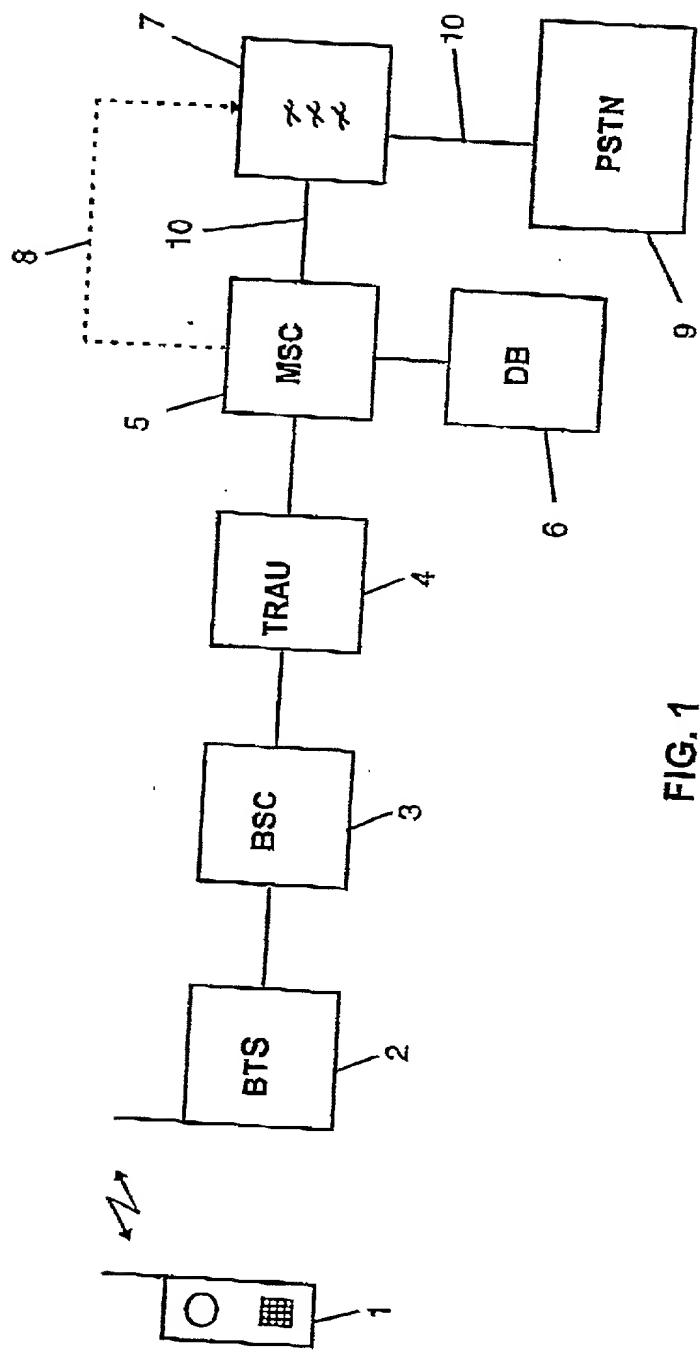


FIG. 1

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**DECLARATION FOR UTILITY OR
DESIGN
PATENT APPLICATION
(37 CFR 1.63)**

Declaration
Submitted
With Initial
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OR

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Submitted after Initial
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(37 CFR 1.16 (e))
required)

| | |
|--------------------------|------------------|
| Attorney Docket Number | 04851/257561 |
| First Named Inventor | BUDNIK, Bernhard |
| COMPLETE IF KNOWN | |
| Application Number | 09/830,831 |
| Filing Date | 5/1/01 |
| Group Art Unit | Unassigned |
| Examiner Name | Unassigned |

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Procedure and Equipment To Improve The Audio Quality In A Mobile Radio Network

the specification of which

(Title of the Invention)

 is attached hereto

OR

 was filed on (MM/DD/YYYY) as United States Application Number or PCT International

Application Number

and was amended on (MM/DD/YYYY)

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

| Prior Foreign Application Number(s) | Country | Foreign Filing Date (MM/DD/YYYY) Country | Priority Not Claimed | Certified Copy Attached? | |
|-------------------------------------|---------|--|--------------------------|-------------------------------------|-------------------------------------|
| | | | | YES | NO |
| PCT/DE99/03616 | PCT | 11/12/99 WO | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 198520913 | Germany | 11/12/98 DE | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

 Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below

| Application Number(s) | Filing Date (MM/DD/YYYY) | <input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto. |
|-----------------------|--------------------------|--|
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[Page 1 of 2]

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DECLARATION — Utility or Design Patent Application

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NAME OF SOLE OR FIRST INVENTOR: A petition has been filed for this unsigned inventor

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| Inventor's Signature  | Date 4.2.2001 |
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Additional inventors are being named on the _____ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.